

Fatigue Sensor

1 Introduction

1.1 About the Functionality

The fatigue sensor is a driver monitoring sensor, from which you can request real-time pictures when driver fatigue/distraction is detected or on-demand via an SMS command. The pictures are stored in the SD card of the tracking device or the internal sensor memory in a .jpg format. The user can remotely manage these pictures.

This feature description applies to tracking devices with the latest firmware version.

You can get the newest firmware and configurator from our documentation website: doc.ruptela.it

1.2 Legal Information

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1.3 Compatibility

The fatigue sensor is compatible with the following devices with the newest firmware version:

- HCV5
- LCV5
- Pro5
- FM-Tco4 HCV
- FM-Tco4 LCV
- FM-Pro4
- FM-Eco4 RS T

1.4 Contact Information

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1.5 Document Changelog

Version	Date	Modification
2.0	2020-07-16	Updated: Connection schematics. Updated: Compatible devices list. Updated: Manual design and construction.
2.1	2020-08-05	Updated: Principles of Operation. Updated: Connection schematics. Updated: Compatible devices list.

1.6 Notations

The following notations are used in this document to highlight important information:

Bold text

Used to indicate user interface elements or for emphasis.

Italic text

Used to indicate items that belong to a list and can be selected.

Note



Used to highlight important information or special conditions.

2 Principles of Operation

2.1 Operation

Once the sensor detects a distracted or drowsy driver, it will immediately send out a sharp and loud alarm. At the same time, the sensor's camera will take a picture.

If the fatigue sensor is enabled in the configuration, it will send the gathered data (file name, source ID and alert ID) to the tracking device. If requested, the tracking device will represent the gathered data and can also indicate how many pictures were taken since the last record and were stored in the SD card. If the tracking device has not obtained the correct date and time from GNSS fix, NTP server, or GSM operator, pictures cannot be taken or sent to the server.

2.2 Picture Storage



Picture storage in the SD card is not applicable for the FM-Eco4 RS T device. The pictures are stored in the internal sensor memory and are sent to the tracking device upon request from a server. Up to 40 pictures can be stored in the internal sensor memory.

If the tracking device has an SD card, the pictures will be stored in the card and sent to a server upon request. If the fatigue sensor folder on the SD card is full, the oldest picture will be overwritten. If the folder is full and there are no pictures on the card, the taken picture will be discarded. After receiving the pictures, the server can then send a request to delete them from the SD card in order to conserve the memory. A maximum of 2000 pictures can be stored in the fatigue sensor folder.

For all devices (except the FM-Eco4 RS T), if there is no SD card inside, no pictures will be taken. The fatigue sensor will indicate alerts in any case.

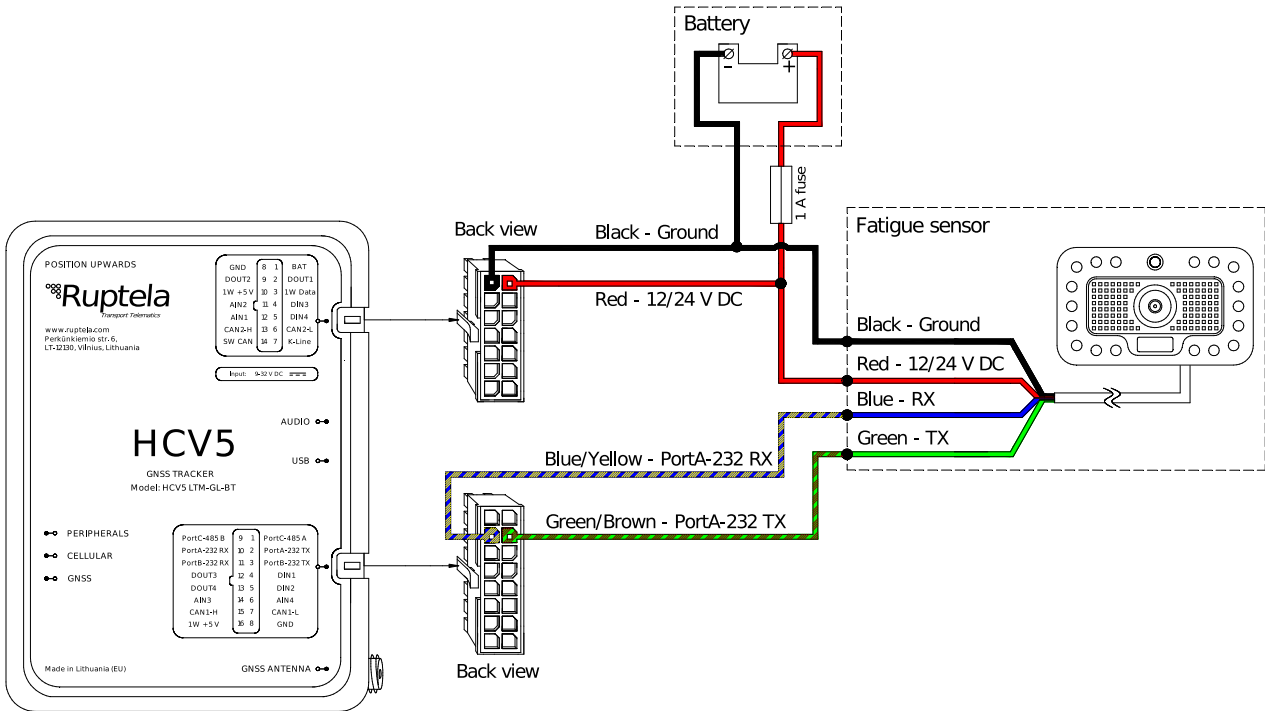


If you insert/remove the SD card, the tracking device should be restarted to ensure correct operation.

3 Connection

3.1 Connection to 5th Gen Advanced Family Devices

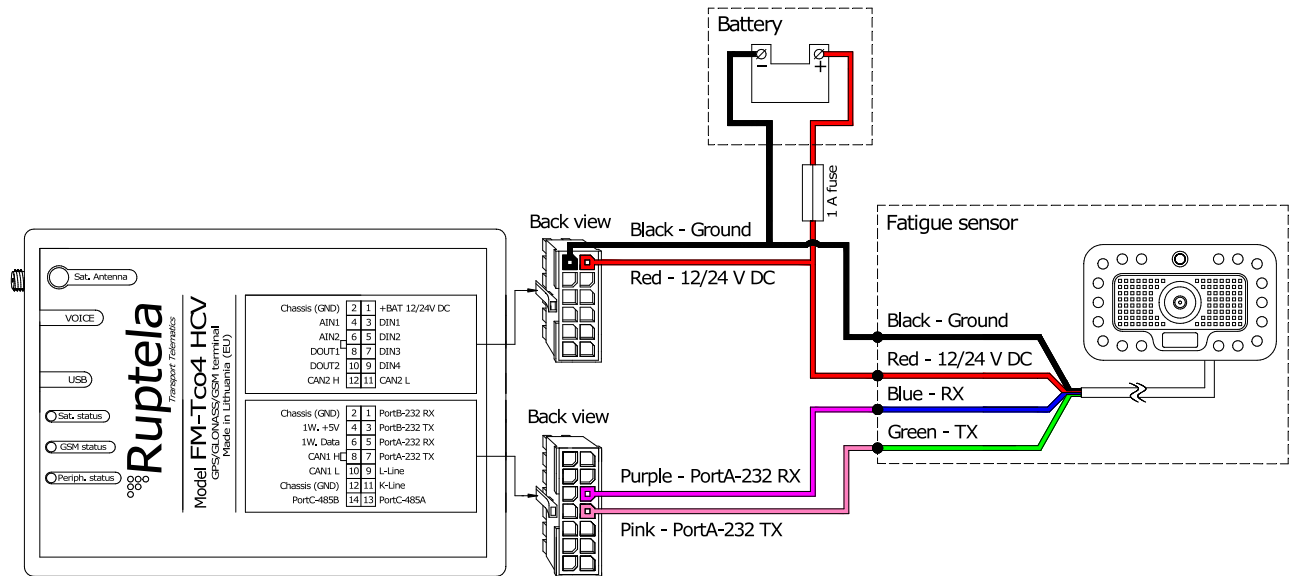
Connect the fatigue sensor to your tracking device as follows (Port A is used in this schematic):



i Alternatively, TX and RX wires can be connected to Port B (16 pin connector, pin 3 and 11, pink/green wire, red/cyan wires).

3.2 Connection to 4th Gen Advanced Family devices

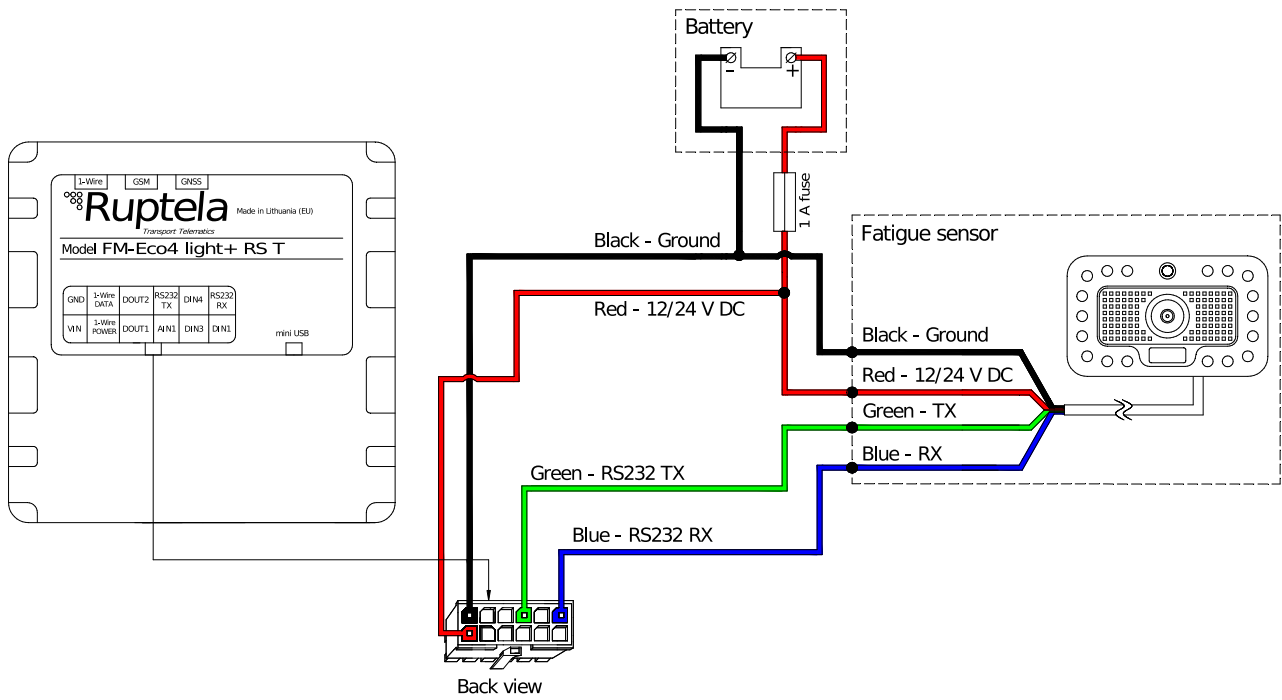
Connect the fatigue sensor to your tracking device as follows (Port A is used in this schematic):



Alternatively, TX and RX wires can be connected to Port B (14 pin connector, pin 3 and 1, orange and yellow wires).

3.3 Connection to FM-Eco4 RS T Device

Connect the fatigue sensor to your tracking device as follows:



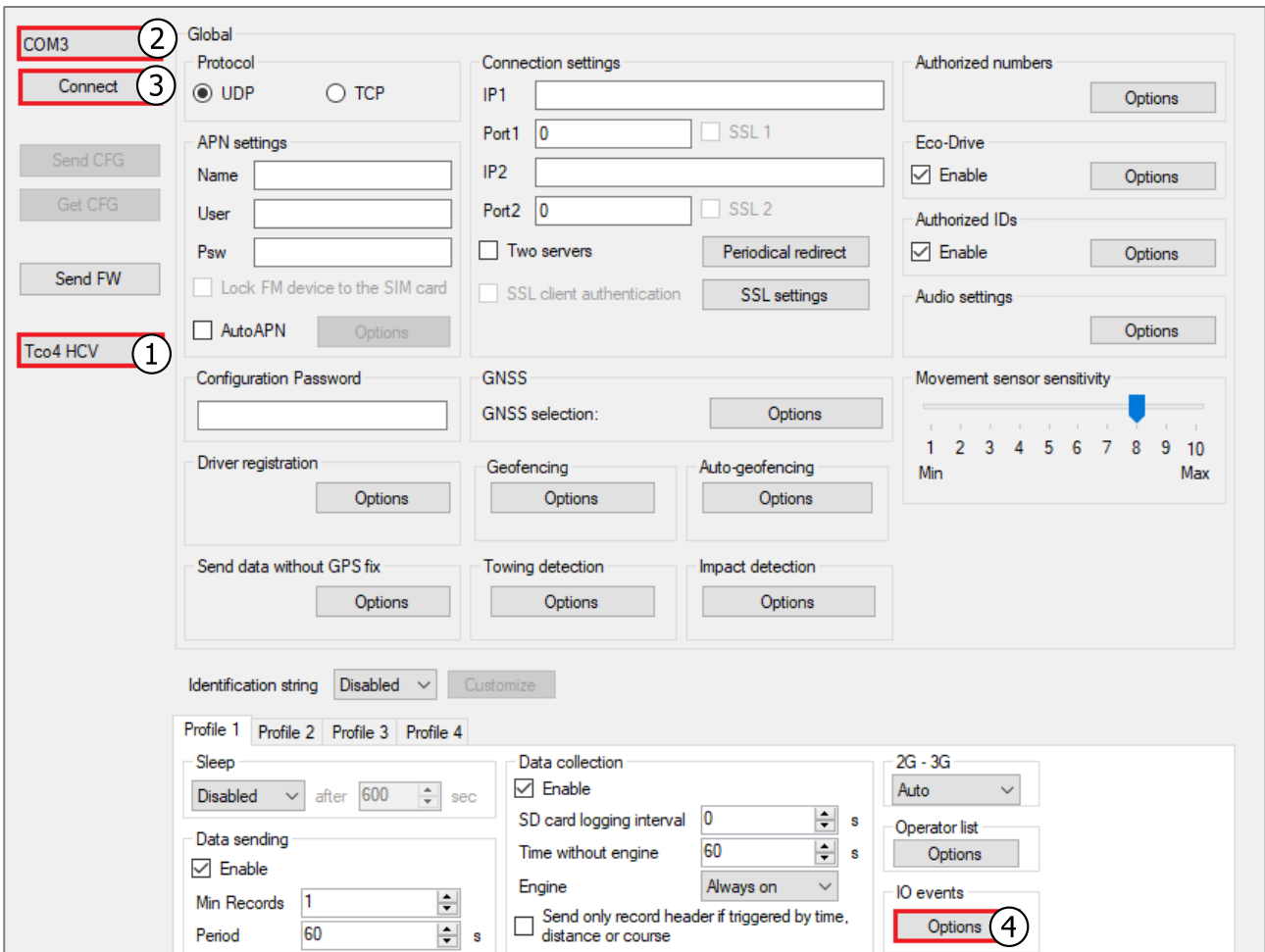
4 Configuration

i This functionality requires the use of the advanced configurator.

4.1 Starting the Configuration

To start the configuration, follow these steps:

1. Open the advanced configurator. Select your tracking device.
2. Select the COM port to which your device is connected.
3. Click **Connect**.
4. Click the **Options** button in the **IO events** section to open the **IO Settings** window.



4.2 Configuring the Fatigue Sensor

4.2.1 Configuration via the Enable IO Button

Follow these steps to configure the fatigue sensor:

1. Tick the **Send I/O data with v1.1 protocol** checkbox (not applicable for the 5th gen Advanced family devices).
2. In the **Interfaces** section select the port, to which the fatigue sensor is connected (*PortA* or *PortB*).
3. Select *Fatigue sensor* from the drop-down list.
4. Click the **Enable IO** button to open the **Configured IO** window.
5. Untick any IO parameter box according to your needs. Click the **Save** button.

i It is recommended to keep all of the IO parameters boxes checked.

i For FM-Eco4 RS T devices, only the *Fatigue sensor alert* parameter can be configured.

The screenshot shows the 'IO settings' window. At the top right, the 'Protocol selection' section has a checkbox for 'Send I/O data with v1.1 protocol' (1). Below it, the 'Interfaces' section has 'PortA' selected with a dropdown menu showing 'Fatigue sensor' (2 and 3). At the bottom of the main window is the 'Enable IO' button (4). A 'Configured IO' dialog box is open in the foreground, showing 'Free slots: 77/80' and 'Selected IOs: 3/3'. It has three checked items: 'Fatigue sensor alert', 'Last snapshot info', and 'Fatigue sensor snapshot on SD card'. At the bottom of this dialog is the 'Save' button (5).

4.2.2 Manual Configuration

Follow these steps to configure the fatigue sensor:

1. Tick the **Send I/O data with v1.1 protocol** checkbox (not applicable for the 5th gen Advanced family devices).
2. In the **Interfaces** section select the port, to which the fatigue sensor is connected (*PortA* or *PortB*).
3. Select *Fatigue sensor* from the drop-down list.
4. Select an empty parameter slot.
5. Enable the slot by ticking **Enable**.
6. In the **ID** section select *Fatigue sensor alert* from the drop-down list.
7. Set **Event on** to *Monitoring* or *Change*.
8. Repeat steps 4-7 with the *Fatigue sensor snapshot on SD card* or/and *Last snapshot info* selections in the **ID** section.



For FM-Eco4 RS T devices, only the *Fatigue sensor alert* parameter can be configured.

The screenshot shows the 'IO settings' window with the following configuration details:

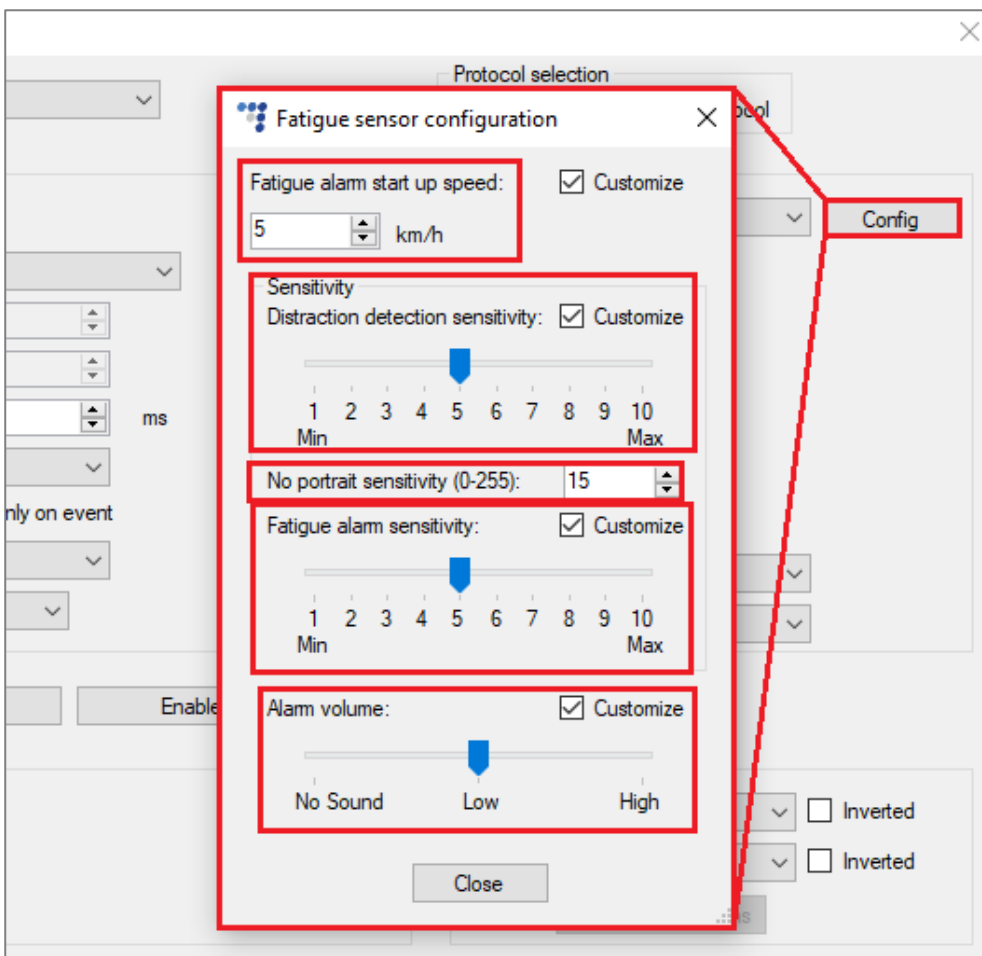
- IO properties:**
 - 1 : Fatigue sensor alert (4)
 - Enable (5)
 - ID: Fatigue sensor alert (6)
 - Level: 0
 - Delta: 0
 - Average: 0 ms
 - Event on: Monitoring (7)
 - Include data only on event
 - Priority: Low
 - Switch to: No Switch
- Protocol selection:**
 - Send I/O data with v1.1 protocol (1)
- Interface:**
 - PortA (2)
 - Fatigue sensor (3)
 - Config
 - PortB
 - PortC
 - K-Line
 - CAN
 - CAN2
 - 1-Wire
 - DIN3 mode: Positive mode
 - DIN4 mode: Positive mode
- Buttons:** Clear all IO, Enable common IO, Enable IO
- IO counters:** Records on event: 1
- Digital outputs:**
 - DOUT1: Disabled Inverted
 - DOUT2: Disabled Inverted
 - Activation conditions

4.2.3 Customization of Parameters

Optionally, you can configure the sensor's parameters to customize its operation and sensitivity. Click the **Config** button to open the **Fatigue sensor configuration** window.

If you want to configure any of the following parameters, tick the **Customize** checkbox:

Fatigue alarm start up speed	Determines the minimum speed of the vehicle for the fatigue alarm to activate. Default value: <i>5 km/h</i> Range: <i>0 – 255 km/h</i>
Distraction detection sensitivity	Use the slider bar to calibrate the sensitivity of distraction detection. Default value: <i>5</i> .
No portrait sensitivity	Calibration of the sensitivity of portrait detection. Default value: <i>15</i> Range: <i>0 – 255</i>
Fatigue alarm sensitivity	Use the slider bar to calibrate the sensitivity of the fatigue alarm. Default value: <i>5</i> .
Alarm volume	Use the slider bar to set the volume of the alarm. There are 3 available positions: <ul style="list-style-type: none">• <i>No sound</i> – turns off the alarm sound;• <i>Low</i> – sets the volume to low;• <i>High</i> – sets the volume to high.



4.3 Finishing the Configuration

To finish the configuration, close the **IO settings** window. Click **Send CFG** to send the configuration to the device.

The screenshot displays the Ruptela Configurator software interface. At the top, there is a menu bar with 'File' and 'Tools'. Below it, a 'Configuration file information' section shows details like 'Configuration source: Configurator', 'Target device: n/a', 'FM device FW version: n/a', 'Advanced Configurator version: n/a', 'CFG Tag: [input field]', and 'Last edited: n/a'. The Ruptela logo is in the top right corner.

The main configuration area is divided into several sections:

- Global:** Includes a dropdown menu for 'COM3', a 'Disconnect' button, and a 'Send CFG' button (highlighted with a red border). Other buttons include 'Get CFG', 'Send FW', and a dropdown for 'Tco4 HCV'.
- Protocol:** Radio buttons for 'UDP' (selected) and 'TCP'.
- APN settings:** Fields for 'Name', 'User', and 'Psw', with checkboxes for 'Lock FM device to the SIM card' and 'AutoAPN' (with an 'Options' button).
- Connection settings:** Fields for 'IP1', 'Port1' (0), 'IP2', and 'Port2' (0), with checkboxes for 'SSL 1', 'SSL 2', 'Two servers', and 'SSL client authentication'. Includes buttons for 'Periodical redirect' and 'SSL settings'.
- Configuration Password:** A text input field.
- GNSS:** A 'GNSS selection:' field with an 'Options' button.
- Geofencing:** A section with an 'Options' button.
- Auto-geofencing:** A section with an 'Options' button.
- Authorized numbers:** A section with an 'Options' button.
- Eco-Drive:** A checkbox for 'Enable' (checked) with an 'Options' button.
- Authorized IDs:** A checkbox for 'Enable' (checked) with an 'Options' button.
- Audio settings:** A section with an 'Options' button.
- Movement sensor sensitivity:** A slider ranging from 1 (Min) to 10 (Max), with a blue marker at 8.

5 Picture Request via SMS



This chapter is not applicable for FM-Eco4 RS T device.

You can take pictures on-demand with the *snapshot* SMS command, using the following structure:

password snapshot 3

After sending the SMS command, the tracking device will send a response, using the following structure: *snapshot 3 <answer>*

<answer> can be one of the following:

- *ok* – indicates that the fatigue sensor took a picture successfully;
- *busy* – indicates that the fatigue sensor is busy with a previously taken picture at the moment;
- *n/a* – indicates that the fatigue sensor is either not configured, not connected or not responding;
- *fullsd* – indicates that the memory of the SD card is full and the picture will be discarded, as there are no pictures to be overwritten;
- *err* – indicates that there was an error.

If the SD card is missing and the SMS command *snapshot* is received, the device responds with *sdc card missing*.

Example:

Request:

password snapshot 3

Response:

snapshot 3 ok